

Table of Contents

1	Product Description	2
1.1	Application	2
1.2	Mounting location	2
2	Function	2
2.1	Characteristics	2
3	Technical Data	3
4	Ordering Information	3
5	Description of Characteristics in Accordance with Type Code	3
5.1	Variants	3
5.2	Connections	3
5.3	Spool	4
5.4	Pressure setting	4
5.5	Actuation	4
5.6	Opening point set value	4
5.7	Setting compensation	5
5.8	Lowering speed adjustable	5
6	Installation	5
6.1	General remarks	5
6.2	Connection recommendations	5
6.3	Settings	6
6.4	Maintenance – filter cleaning	6
6.5	Dimensions SAE 1 1/4" variant	7
6.6	Dimension SAE 1" variant	8
7	Notes, Standards and Safety Requirements	8
7.1	General remarks	8
7.2	Standards	8
7.3	Safety requirements	8
8	Accessories	8

1 Product Description

In case of a pipe or tube rupture load control valves avoid uncontrolled movement of the cylinder. In some countries these valves are required by law when a construction machine is used for load lifting purposes. They also serve for an exact and stable positioning of the boom and enable sensitive and even movement processes. Pipe rupture valves can compensate for leakages on the main control valves in older construction machines. WESSEL pipe rupture valves stand for an excellent sensitivity and a very direct response to the handle's stroke. In any case they are leakage free.

This pipe rupture valves can be controlled in a hydraulically proportional or electrical-proportional manner and automatically limits the descending speeds for high loads.

1.1 Application

The pipe rupture valve is specially designed for the boom cylinder/rocker cylinder of a crane. Through the kinematics of the machine, the cylinder pressure can increase in the downward movement. In standard variants, the volume flow also increases with the increasing pressure. This effect is compensated or even overcompensated for this hose rupture valve through additional valve technology. Proportional control of this variant is possible through hydraulics or electronically.

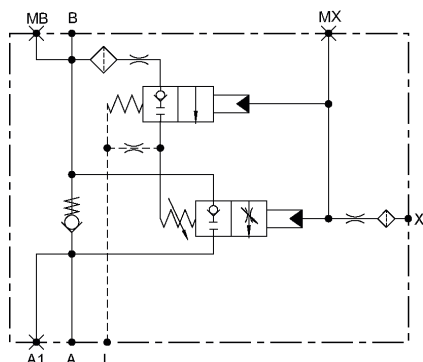
1.2 Mounting location

The load control valve is installed in the line to be protected between the main control valve and the hydraulic cylinder and is flanged directly on the cylinder. Additional pipework and piping between load control valve and cylinder is not permissible.

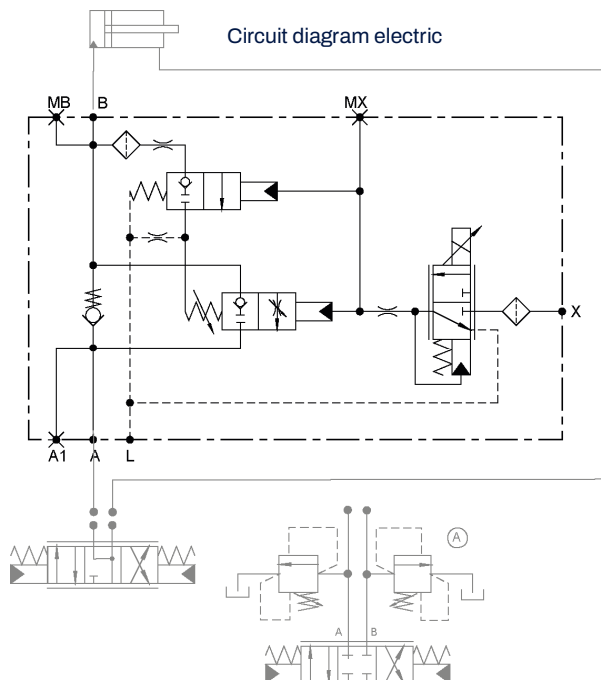
2 Function

The pipe rupture valve is flanged on the bottom side of the cylinder and is closed in the idle position leakage-free. When the cylinder is extended, the hydraulic fluid from connection A is conveyed freely to the cylinder connection B via a check valve. For retraction, the pilot control pressure in connection X is given directly to the actuator face of the load control valve either via a proportional signal (hydraulically proportional actuation) or via an electrically controlled proportional valve. The lowering movement is thus initiated. By increasing the pilot control pressure or respectively the flow at the proportional valve, the released opening cross-section increases. During lowering, the return pressure at connection A should be as small as possible so that a speed increase does not take place during a hose or pipe break. The internal compensation valve reduces the opening cross-section with increasing load pressure so that a speed increase does not occur with the lowering of a boom and the pressure increase caused by the kinematics. A downstream pressure restriction valve is required when the main directional control valve has a closed middle position (A). The load control valve itself is pressure-compensated so that from the return pressure no closing force acts on the pipe rupture valves.

Circuit diagram hydraulic



Circuit diagram electric



2.1 Characteristics

- Meets the requirements of standards: DIN24093, ISO 8643, EN 474
- Start opening independent of the load pressure
- Sensitive control with low hysteresis
- Leakage-free
- Rupture valve piston pressure-compensated
- Can be flanged directly onto the cylinder connection
- Electrically proportional or hydraulic actuation
- Proportional valve and compensation valve protected by a filter
- Setting options for the opening start and the height of the compensation

3 Technical Data

Criterion	Units	Value
Max. operating pressure	bar	420
Max. volume flow	l/min	600
Weight	kg	SAE 1": 8,5; SAE 1 1/4": 13,0
Opening point set value	bar / mA	10 / 400
Full opening	bar	Opening pressure + leak oil pressure + 20
Connection		
Z, ST		SAE 1", SAE 1 1/4", DIN ISO 6162-2, SAE J518/2 (CODE62)
M, X		G 3/4"; ISO 1179-1, p _{max} < 50 bar
L		SAE 1" : G 3/4" ISO 1179-1, p _{max} < 1 bar SAE 1 1/4": M14x1,5 ISO 9974-1, p _{max} < 1 bar
Installation position		Any
Hydraulic fluid		Mineral oil (HL, HLP) conforming with DIN 51524, other fluids upon request
Hydraulic fluid temperature range	°C	-20 – +80
Ambient temperature:	°C	< +50
Viscosity range	mm²/s	2.8 – 500
Contamination grade		Filtering conforming with NAS 1638, class 9, with minimum retention rate β ₁₀ ≥ 75

4 Ordering Information

LHB	3E			000		010/40		0
00	01	02	03	04	05	06	07	08
00	Product group	Load Control Valve Boom						LHB
01	Variant	Load compensated						3E
02	Connections	Cylinder ,main control valve	SAE 1“ - DIN ISO 6162-2,SAE J518/2 (CODE62) SAE 1 1/4“ - DIN ISO 6162-2,SAE J518/2 (CODE62)					05E 05G
03	Spool	Design of the spool optimized for the specified volume flow; version SAE 1“				from 250 l/min to 400 l/min		250
								300
								350
								400
		Design of the spool optimized for the specified volume flow; version SAE 1 ¼ “				from 400 l/min to 550 l/min		400
								450
								500
							550	
04	Pressure setting	No internal pressure control, intermediate plate necessary!						000
05	Actuation	Hydraulically proportional, connection G1/4						HYP03B
		Electrically proportional, 24 Volt, AMP Junior Timer						24P002
06	Opening point set value	Valve opens when pilot control pressure is approx. 10 bar						010
		Valve opens when electrical pilot signal is approx. 400 mA						400
07	Setting compensation	No compensation						00
		Low compensation: Load pressure acts slightly volume-flow-increasing						01
		Standard compensation, at load pressures > 120 bar volume flow constant						02
		Strong compensated, at load pressures > 120 bar volume flow reduced						03
08	Maximale Senkgeschwindigkeit einstellbar					nicht verfügbar		0

Verschiedene Konfigurationen sind aus technischen Gründen leider nicht realisierbar. Bitte lassen Sie sich bei Fragen hierzu von uns beraten.

5 Description of Characteristics in Accordance with Type Code

5.1 Variants

Load compensated

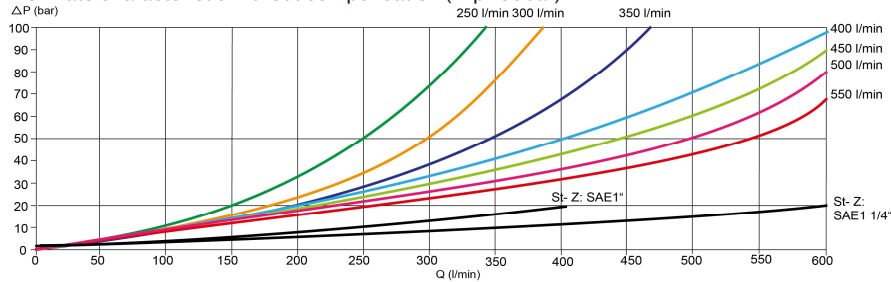
5.2 Connections

The valves are flanged directly on the cylinder to be protected (connection Z). The supply line from the control valve takes place via the connection ST. Both connections are designed the same size.

5.3 Spool

The control slider is calculated to the maximum desired volume flow (Z → ST). Criterion: Nominal volume flow, in which a maximum pressure loss (Δp) of 50 bar is generated (Z → ST).

Flow rate characteristic without compensation ($\Delta p=50\text{bar}$)



5.4 Pressure setting

This hose rupture valve is designed without a pressure restriction valve for safety reasons:

If a pressure restriction valve opens, this could lead to the uncontrolled lowering of the boom. The maximum load pressure should thus be designed so that there is also sufficient safety against the bursting of the cylinder during dynamic processes and the maximum pressure of the hose rupture valve is not exceeded.

Through solar irradiation, a pressure increase can occur through the heating of the cylinder. If the cylinder is not protected by a thermal pressure restriction valve, this effect can be avoided through a pressure restriction valve intermediate plate ("sunshine valve").

5.5 Actuation

The valve can be proportionally controlled through hydraulics or electronically.

For safety reasons, we recommend only making the pilot control pressure available via a further external directional valve when an activation of the consumer is to follow.

Hydraulically proportional:

The actuation takes place at connection X. The pilot control signal leads between 10 bar and 30 bar to the valve opening and may not exceed 50 bar.

Electrically proportional:

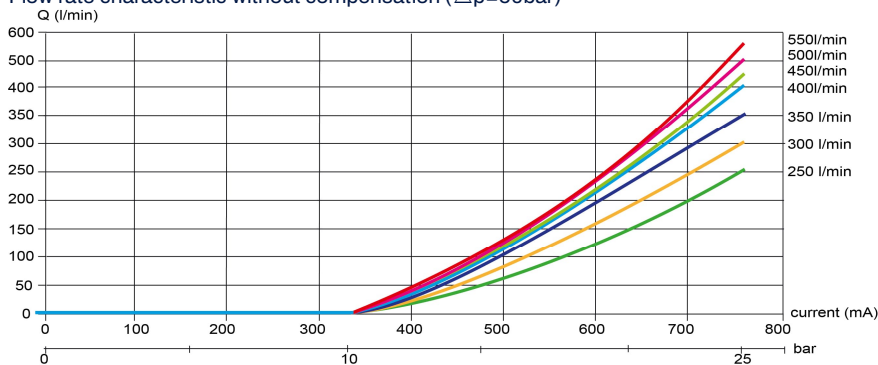
The valve must be supplied at connection X with a pilot control pressure of at least 30 max. 50 bar.

For the electrical actuation of the valve, using a current-regulated, pulse-width modulated amplifier card, restricting current to I2 is recommended. The hydraulic hysteresis achieves minimum values at a modulation frequency of 100 Hz. A modification may be necessary depending on the hydraulic natural frequency.

Criterion	Unit	Value
Limit current Ia:	A	0.75 ; PWM frequency 100 Hz
Voltage tolerances:	%	±10
Power-on time:	%	100
Protection class according to		IP 65
Connector:		AMP Junior Timer

Criterion	Unit	Value
Insulation material		H
Power-on time:	%	100
R20:	ς	21,2 +/- 5%
I1:	mA	300 +/- 10%
I2:	mA	750 +/- 10%

Flow rate characteristic without compensation ($\Delta p=50\text{bar}$)



Through the compensation (see characteristic 7), the load results in smaller opening cross-sections than expected due to the pilot control pressure / current!

5.6 Opening point set value

The start of movement is at a pilot pressure of 10 bar or with electr. Prop. Pilot control designed for 400 mA. The spool is completely open at 30 bar pilot pressure or 750 mA.

The opening point cannot be adjusted as it is tuned to the load compensation. Changes to the opening point are not permitted.

5.7 Setting compensation

Compensation of the impact of load pressure on the lowering speed. The setting is preset in the factory and cannot be changed.

No compensation

The load pressure had no impact on the opening cross-section of the load control valve. Higher load pressure leads to higher lowering speed.

Low compensation

The load pressure only has a slight impact on the opening cross-section of the load control valve.

Higher load pressure – slightly higher lowering speed.

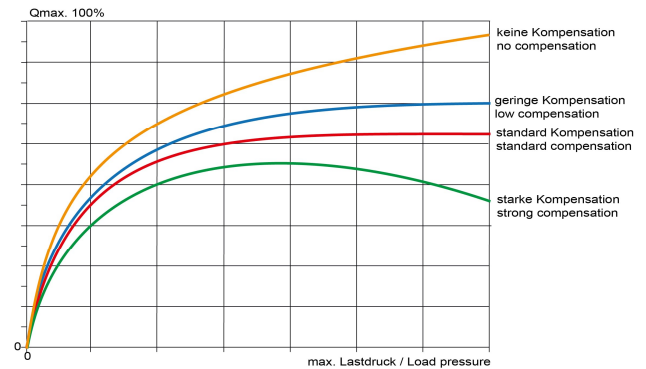
Standard compensation

The load pressure impacts the opening cross-section of the load control valve so that as of approx. 120 bar the lowering speed remains constant at the same pilot control pressure.

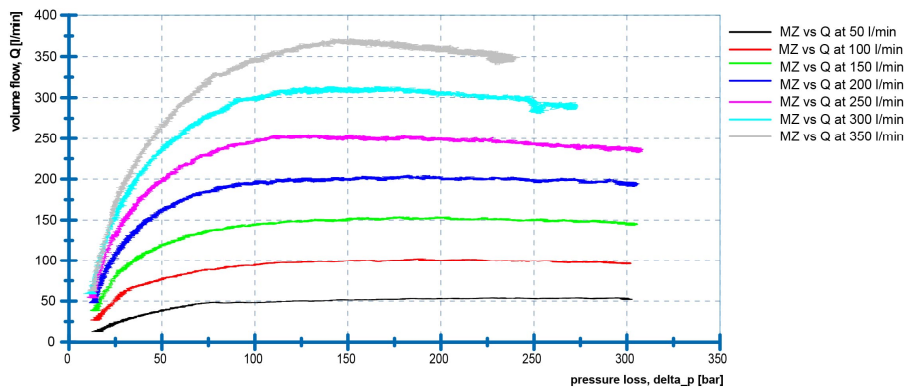
Strong compensation

The load pressure closes the opening cross-section of the load control valve so far that as of approx. 120 bar the further increase in the load pressure leads to a reduction in the lowering speed.

Flow rate characteristic for maximum pilot control signal



LHB-3E SAE 1 1/4" CD62



5.8 Lowering speed adjustable

Not available for this variant.

6 Installation

6.1 General remarks

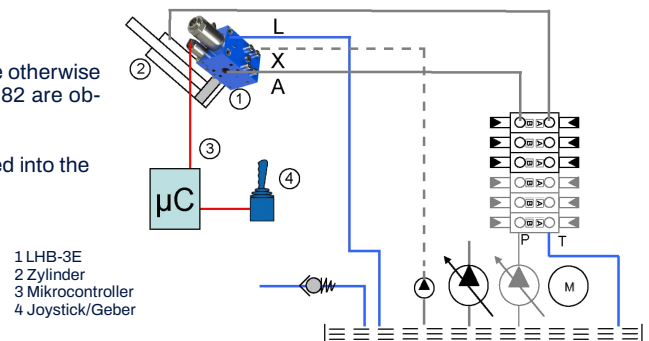
- Observe all installation and safety information of the construction machine manufacturer.
- Only technically permitted changes are to be made on the construction machine.
- The user has to ensure that the device is suitable for the respective application.
- Application exclusively for the range of application specified by the manufacturer.
- Before installation or dismantling, the hydraulic system is to be depressurized.
- Settings are to be made by qualified personnel only.
- May only be opened with the approval of the manufacturer, otherwise the warranty is invalidated.
- The included connection recommendations are not guaranteed. The functionality and the technical specifications of the construction machine must be checked.

6.2 Connection recommendations



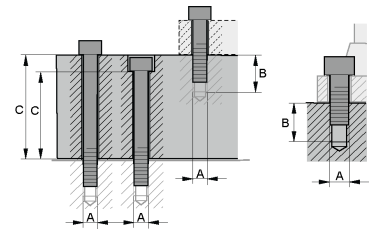
Hydraulic hoses are not to come into contact with the load control valve because otherwise they are subject to thermal damaging. Ensure that standards EN 563 and EN 982 are observed.

It is recommended to depressurize the X connection with an additional valve to be integrated into the pilot control circuit when the load control valve is not actuated.



Installation - space

- Observe the connection labels.
- Observe the strength category and torsional moment (see appendix) of the fastening bolts.
- Do not damage seals and flange surface.
- The air must be exhausted from the hydraulic system.
- Observe the recommended mounting screws



read (A)	Strength class	Thread depth (B)	Tightening torque (Nm)	C (mm)
DIN ISO 6162-2, SAE J518/2 (CODE62)				
M12	10,9	21,5	130	SAE 1" = 89,5
M14	10,9	23,5	150	SAE 1 1/4" = 97,5

6.3 Settings

The proportional hose rupture valve is preset to 10 bar opening start. The compensation valve is matched with the opening start.



ATTENTION

Do not change either of the set values. A complete evaluation is required for the use of this valve in a new application..

6.4 Maintenance – filter cleaning

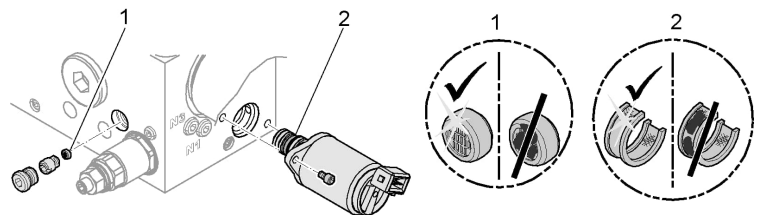


Note If the hydraulic medium becomes contaminated, the filter insert (1/2) must be checked and cleaned if necessary.

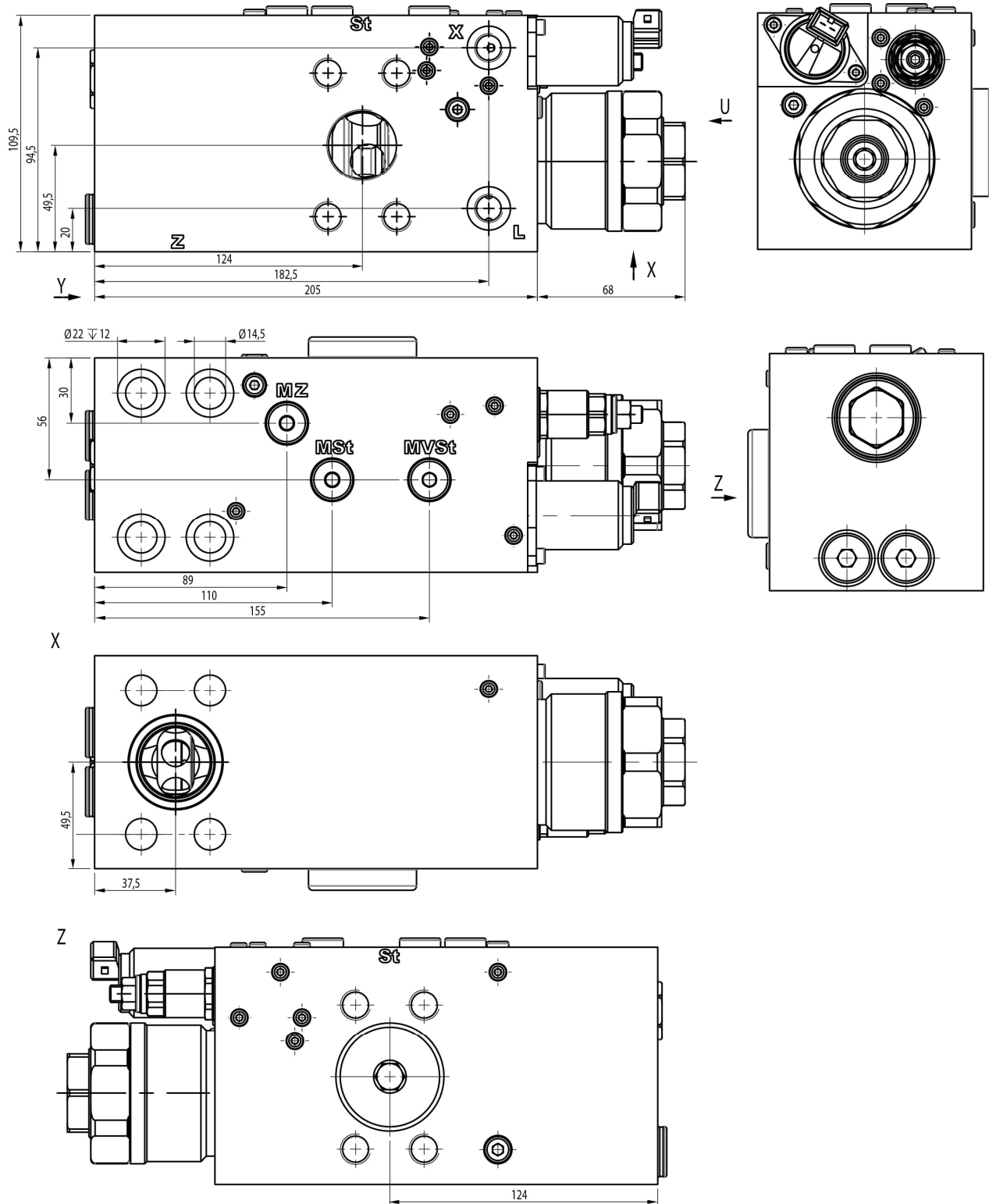
- Remove the proportional valve
- Clean the filter elements in the holes

ohne Einstellung der max. Senkgeschwindigkeit

mit Einstellung der max. Senkgeschwindigkeit



6.5 Dimesions SAE1 1/4" variant





7.1 General remarks

- The views in drawings are shown in accordance with the European normal projection variant
- A comma (,) is used as a decimal point in drawings
- All dimensions are given in mm



Die Rohrbruchsicherung erfüllt die Anforderungen der Normen:

- DIN 24093
- ISO 8643
- EN 474

The following standards are to be observed because of the surface temperatures on the load control valve:

- EN 563, Temperatures on surfaces that can be touched.
- EN 982, Safety-technical requirements for fluid-technical systems and their components.

7.3 Safety requirements

- WESSEL-HYDRAULIK GmbH bestätigt die Verwendung der grundlegenden und bewährten Sicherheitsprinzipien nach ISO 13849-2: 2003, Tabellen C.1 und C.2 für die Konstruktion des hier beschriebenen Ventils.
- WESSEL-HYDRAULIK GmbH besitzt ein zertifiziertes Qualitätsmanagementsystem nach DIN EN ISO 9001.
- Der MTTFd-Wert für das beschriebene Ventil kann vom Maschinenhersteller mit 150 Jahren angenommen werden!
- Hinweis: Der Anwender ist dafür verantwortlich, dass die grundlegenden und bewährten Sicherheitsprinzipien nach ISO 13849-2: 2003, Tabellen C.1 und C.2 für die Implementierung und den Betrieb des hydraulischen Bauteils erfüllt werden!

8 Accessories